

Committee on Resources, Subcommittee on Forests & Forest Health

[forests](#) - - Rep. Scott McInnis, Chairman

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Witness Statement

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Use of Forest Thinnings as Fuel for Biomass Power Facilities

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By William H. Carlson

With a US Forest Service estimate of 89 million acres within the National Forests of the West at moderate to high risk of catastrophic fire, we have a mighty job on our hands if we are to remove hazard fuels before these lands burn catastrophically. If we give ourselves two decades to complete this task, and we will be lucky if we have that long, we would need to treat 4.5 million acres per year. With perhaps 50 tons of excess fuel per acre needing to be removed, a total of 225 million tons annually of excess fuel would need to be burned under controlled conditions or mechanically removed from the site.

When you talk in quantities of 225 million tons per year, you quickly settle your potential solutions on extremely high volume uses, such as the potential to produce transportation heating fuels or electricity, two of the very largest industries in America. You could continue to burn up this material in prescribed fires, but at 30 lbs. of particulate matter per ton burned, it is unlikely that the agency would be allowed to introduce an additional 3.4 million tons of particulate annually into western skies.

If we assume a 50/50 split of prescribed fire and mechanical thinning due to slope limitations, etc., each would be performed on 2.25 million acres annually, producing over 110 million tons of excess biomass annually, still clearly a massive undertaking.

We will now focus exclusively on the production of electric power from biomass to see if it is potentially up to the task of utilizing most or all of this material. Currently, the DOE estimates that there are 7,800MW of biomass electric power in 350 individual plants, most associated with the forest products industry. A typical base loaded biomass plant will consume 15,000 tons/MW annually (8,000 bone dry tons) of fuel. The 110 million tons of thinnings to be consumed would fuel 7,300MW of new capacity, essentially a doubling of the current industry.

Since biomass is a very bulky, low value fuel, the plants must be located quite close to the resource (within a 50-75 mile radius). Consequently, if we are to build plants to take thinnings from 2.25 million western acres annually for 20 years, all the plants must be located in the West. With the exception of Alaska, all the 89 million acres of overstocked western forests lie within the interconnected western electric grid of the Western Systems Coordinating Council (WSCC). This grid, which has a peak load in excess of 100,000MW, has recently been growing at a rate of 2-5% annually. Thus, the region needs 2-5,000MW of new capacity annually just to keep its head above water. Over a 10-year buildout period for the biomass plants, the region would need 20-50,000 new MW's, of which the 7,300MW's would be biomass, a comfortable fraction.

As a further sales pitch for biomass power, let me add that these plants need no pilot studies; either for the plants, the economics or the thinning techniques. For the last 15+ years in Northern California these plants have been reliably producing power, partially fueled by forest thinnings. Nearly a million acres of both private and public lands have been thinned to produce a "desired forest condition", and the results are there for all to see. The results on the land and in the plants are heavily supported by local government agencies, state forestry officials, air quality officials, the California Energy Commission, local environmental groups and the public. The success of these plants and their positive impact on the land is what led this body to pass the Quincy Library Group bill a couple of years ago with only one dissenting vote.

Let us turn now to the economics of using biomass power plants as a sink for large quantities of forest thinnings; both the economics of the plant and the economics on the land. Beginning with the land we find that if the U.S. were to commit to a 20-year program of fuel reduction on USFS lands in the West, it would take a massive amount of money. To treat completely 4.5 million acres annually with prescribed fire until the "desired forest condition" is achieved would likely cost in excess of \$400 per acre (Figure 1), or \$1.80 billion annually for 20 years. Clearly, we must look for a lower cost and more environmentally benign option.

Our 15 years of experience in forest thinning for both public and private landowners has convinced us that there is a lower cost option involving mechanical thinning that can, under certain conditions, actually return a profit to the landowner. Figures 2 and 3 represent two thinning scenarios, one with and one without pulp chip removal, that both result in a positive return to the landowner.

The key to operating a cost-effective thinning operation is to create no artificial or arbitrary barriers to thinning. The single criteria is to establish a "desired forest condition" that is a forest that resembles presettlement condition and thus is both healthy and fire resistant. The trees that are to be left are then marked, providing the proper mix of sizes, spacing and desired species. Thickets or openings can be incorporated for specific wildlife purposes. Basically, you are removing the small trees beneath the big trees.

Once marked, the unit is then turned over to a thinning contractor who removes the unmarked material. The contractor then sorts through the removed material to find products having a value greater than that of mere fuel. In our experience an acre thinned from below to produce the "desired forest condition" will yield, in addition to 29 tons of fuel, some 2-5000 board feet of small logs. It is the value of the logs that allows the thinning cost to be completely paid by the contractor, often returning a small profit to the landowner (\$180/acre). If pulp chips have a ready market in the area, the economics prove even better (\$700/acre). Both of these examples assume fuel has no value and has to be delivered to a power plant for free. If the power plant can pay transportation costs, the economics improve further.

Thus, it is possible to thin large acres of national forest land in the West at no cost to taxpayers, provided

there is an infrastructure of biomass power plants and forest products mills, and provided no arbitrary constraints (i.e. maximum diameter limits) are placed on the operation. If the criteria is simply to remove excess fuels and return our western forests to a presettlement condition, it can be accomplished very cost effectively and environmentally beneficially with mechanical thinning.

In nearly all the West, the infrastructure of forest products mills already exists, though a high percentage are currently closed due to recent dramatic curtailments in federal timber sale levels. Many would have to be retooled to handle the predominantly small logs that this type of operation produces.

An infrastructure of biomass power plants does not currently exist, however, except in California. To create these plants in the West within 5-10 years will require a sound economic basis for the investment. Figure 4 is a set of economics for a 30MW biomass power plant located in the rural west and built at a cost of \$60 million. The debt is financed over a 20-year period. The total expense for the plant, on a per kWh basis, is slightly in excess of 6¢/kWh which is a reasonable cost in today's western electric markets. That cost is assumed to be as much as 2¢/kWh over market once natural gas prices return to past levels.

To cause these plants to be built in support of a large scale forest thinning program, it will be necessary to incentivize them in the form of a federal biomass tax credit which is currently only available to "closed loop" biomass plants. "Closed loop" is made up of fuel sources that are grown exclusively for burning, clearly not the case in this example. The change in the tax code to allow "open loop" plants a credit has been close to passage each of the last two years and is currently included in both the Republican and Democratic versions of proposed energy legislation. The minor change in tax law is certainly something that could happen this year.

Clearly, mechanical thinning of overstocked national forest lands in the West over the next two decades can solve a major share of the forest health and fire potential problems. Though the quantities of materials that must be removed are staggering, they could be accommodated in forest products mills and biomass power plants without unrealistic changes to the region's infrastructure. In addition to being an environmentally superior method of reestablishing our western forests, the proposal has the following additional benefits:

- Restores large-scale economic activity in areas of the West that have suffered great economic distress.
- Avoids the massive air pollution and threat of escape that plagues a large scale prescribed burning program (Figure 5).
- Replaces the volume of federal timber lost over the last decade in the region, albeit with smaller logs.
- Dramatically increases the amount of renewable energy produced in the West, taking pressure off our fossil fuel needs, much of which is imported.
- Allows private capital to replace federal dollars in solving our forest health problems.
- Can be a solution that brings together diverse interests in support (see attached brochure).

For the above-described scenario to develop, it is a rather short list of things that Congress must do:

- Establish a long-term commitment to forest thinning as the primary mechanism for reestablishing health in western forests and establish broad rules for its implementation.

- Authorize federal land management agencies to enter into long term stewardship contracts that are measured on an "acres treated" basis rather than a traditional timber sale basis.
- Pass the "open loop" biomass provision in the IRS Section 45 Tax Credit for Wind and Biomass that is due to be reauthorized this year.

The forest products and biomass energy industries stand ready to invest many billions of private capital to create an infrastructure to cost effectively solve the forest health and fire potential problems in the West in an environmentally superior way. For that to happen, however, it will require a long-term commitment on the part of Congress and the President to the process described in this paper. While changes in federal law required are few, they will be somewhat controversial initially, but will ultimately be proven to be the best approach, both environmentally and economically, as they have been in Northern California. We urge you to move quickly, as another fire season approaches. We do not need more studies or pilot programs; we need action from this Congress before the rest of the western forests go up in smoke.

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